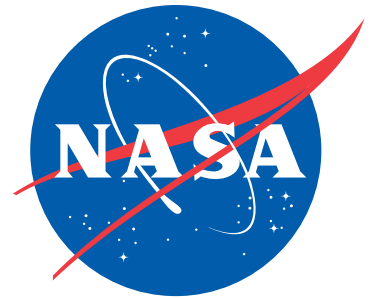


Spaceport News

John F. Kennedy Space Center - America's gateway to the universe



All Hands

Cabana: Next 50 years will be better

By Frank Ochoa-Gonzales
Spaceport News

While change is constant, the mission for Kennedy Space Center remains the same after five decades, said Center Director Bob Cabana to workers during an All Hands on July 13 at the Training Auditorium.

"Although we have faced a lot of changes and challenges, we have made tremendous progress, and one thing hasn't changed -- we are a premier launch complex," Cabana said. "We must continue to change, we have to evolve if we want to be better. Nobody does what we do."

Cabana said certain challenges have to be met on the path to Kennedy's future:

- Build the right capabilities for human space exploration
- Face a tough situation and transition
- Remain a strategic part of NASA's evolution



NASA/Chris Chamberland

At an All-Hands meeting July 13, Kennedy Space Center Director Bob Cabana and other Kennedy leaders gave an update of center activities to workers.

• Have a plan to move forward
"When you consider a year ago Atlantis landed and the Space Shuttle Program ended . . . what we have been able to accomplish since then . . . it is phenomenal," Cabana said.

Cabana said Kennedy workers' expertise in launch vehicle and spacecraft processing, launching, landing and recovery, operations, and sustaining efforts has led the way to the building of a 21st century launch complex of the future, enabling government and commercial space providers.

"During the past 50 years, we have evolved, additionally, to be value-added to our nation's space program through acquisition and management of launch services and commercial crew development, payload and flight science experiment processing, and next-generation technology development," Cabana said, "and we continue to show our expertise in these areas."

Center Operations Deputy Director Nancy Bray shared Kennedy's concept of the Central Campus, which will have two phases. Both phases currently are being designed. Phase 1 includes a 200,000-square-foot facility that will house offices and shared services (which will break ground in Spring 2014), and the Kennedy Data Center (which will break ground in Fall 2013).

Central Campus Phase 2 also is a 200,000-square-foot facility that will be integrated to the east side of Phase 1 and provide additional office space in support of consolidation facilities. Its groundbreaking is scheduled for Spring 2017, when the demolition of Headquarters and the Central Instrumentation Facility (CIF) will occur.

Jennifer Kunz briefed Kennedy workers on the status of the Ground Systems Development Office (GSDO). Kunz shared the GSDO's

See **ALL HANDS**, Page 3

Cella Energy signs fuel source deal with Kennedy

By Steven Siceloff
Spaceport News

A new approach to an established fuel will be the focus of research, development and possible production with the help of NASA's Kennedy Space Center in Florida.

Cella Energy's American subsidiary is partnering with Kennedy to make its micro-bead technology practical enough to be used as a fuel in most kinds of machinery, cars, portable electronics and perhaps even spacesuits.

The company, based in Britain, has formulated a way to store hydrogen safely in tiny pellets that allows the fuel to be burned in an engine. Kennedy, which handles huge amounts of the explosive gas regularly as part of its rocket work, is being enlisted to help the company overcome a couple of technological hurdles.

If the work pays off, engines all over the world could run on hydrogen, which burns clean, producing no greenhouse gases.

See **ENERGY**, Page 2

Inside this issue...

Sally Ride



Page 2

Forrest McCartney



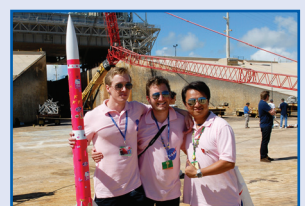
Page 3

Educational outreach



Page 5

ISU rockets launch



Page 6

In Memoriam

Ride inspired, took giant leap for women

By Bob Granath
Spaceport News

Sally Ride is best known as the first American woman in space. Following her death on July 23, 2012, at the age of 61, she also is being remembered as a soft-spoken physicist who wanted to inspire young people to consider careers in technical fields.

"As the first American woman to travel into space, Sally was a national hero and a powerful role model," President Barack Obama said in a statement released by the White House. "She inspired generations of young girls to reach for the stars and later fought tirelessly to help them get there by advocating for a greater focus on science and math in our schools."

NASA Administrator Charles Bolden added his praise for Ride's example.

"Sally Ride broke barriers with grace and professionalism – and literally changed the face of America's space program," said Bolden, a fellow shuttle astronaut. "The nation

has lost one of its finest leaders, teachers and explorers. She will be missed, but her star will always shine brightly."

Following her career with NASA, in 2001 Ride founded her own company, Sally Ride Science, to pursue her long-time passion of motivating girls and young women to pursue careers in science and math.

"Sally was a personal and professional role model to me and thousands of women around the world," said NASA Deputy Administrator Lori Garver. "Her spirit and determination will continue to be an inspiration for women everywhere."

A Los Angeles native, Ride was an outstanding athlete who was nationally ranked in tennis as a youth.

She went on to attend Stanford University where tennis great Billie Jean King saw how well she played and suggested she leave college and become a professional tennis player.

Ride decided to stay in school, earning four degrees including a doctorate in physics in 1978.

One of 35 astronauts selected in 1978, Ride was in the first group of Americans selected for spaceflight



NASA file

Sally K. Ride, who became America's first woman in space in 1983, flew on two shuttle missions.

that included women and minorities. She and five other women were chosen out of 8,000 total applicants. The class dubbed themselves the "Thirty-Five New Guys."

Ride was one of the first four "New Guys" launched into orbit when she was a member of Challenger's STS-7 crew, which lifted off June 18, 1983. She was preceded in space by two Soviet women, Valentina Tereshkova who flew aboard Vostok 6 in 1963 and Svetlana Savitskaya, on Soyuz T-7 in 1982.

"The fact that I was going to be the first American woman to go into

space carried huge expectations along with it," Ride recalled in an interview for the 25th anniversary of her flight in 2008.

"The thing that I'll remember most about the flight is that it was fun," said Ride. "In fact, I'm sure it was the most fun I'll ever have in my life."

Ride returned to space on STS-41G, launched Oct. 5, 1984. Ride later served on the Presidential Commission on the Space Shuttle Challenger Accident that investigated the loss of the seven-member STS-51L crew in January 1986. She then accepted a job as a special assistant to the NASA administrator for long-range and strategic planning.

Ride left NASA in 1989 to join the faculty at the University of California, San Diego, as a professor of physics and director of the University of California's California Space Institute.

After the loss of the STS-107 crew in 2003, Ride again helped the agency by serving on the Columbia Accident investigation Board.

President Obama said, "Sally's life showed us that there are no limits to what we can achieve and I have no doubt that her legacy will endure for years to come."

From ENERGY, Page 1

"We have a lot of great capabilities at Kennedy and some exceptional talent in both our materials and cryogenics labs and I think that's what mostly attracted them to us," said Robert Hubbard, Partnership Development manager at Kennedy.

Hydrogen poses many limitations, largely because it can be very difficult to handle safely.

The pellets, each holding a large amount of hydrogen, could erase that concern, Hubbard said.

"In tests, the hydrogen is stored in its rawest form, encased by the company's hydrogen storage materials, and proven to be quite



NASA/Kim Shifflett

Cella Energy is expected to become an early tenant at Kennedy Space Center's Exploration Park, shown here under construction Nov. 29, 2011. The company already operates offices in the Space Life Sciences Laboratory at Kennedy.

stable," Hubbard said.

The eventual goal is to use it in fuel cell engines, which combine hydrogen and oxygen to generate electricity. The only exhaust from fuel cells is water. Again, the technology is something Kennedy is very comfortable

with since fuel cells have been used in Apollo spacecraft and space shuttles.

"If the company is able to successfully get this product to market, I think we are going to see a lot of changes within the hydrogen storage and fuel cell industries to

utilize more safe and easily adaptable technologies," Hubbard said.

Cella's contract with NASA, called a Space Act Agreement, runs five years and can be extended. The company already has offices in the Space Life Sciences Laboratory at Kennedy and is expected to become an early tenant at Exploration Park, a research center now under construction at the space center.

"In the future, it could turn into a production site within Exploration Park," Hubbard said.

Kennedy's obligation under the agreement is to serve as a consultant to Cella for developing an integrated solution for hydrogen storage

and help Cella incorporate Kennedy-developed hydrogen sensing color-changing polymers. Cella also is interested in working with lightweight aerofoam and aeroplastic, another NASA innovation, notable for its thermal insulating properties.

The partnership is the latest signal to industry that Kennedy is serious about developing clean energy sources and innovative industries, Hubbard said.

"We're trying to expand Kennedy's portfolio of capabilities," Hubbard said. "We want to be on the cutting edge of developing green energy technologies and what better place to do it than Kennedy's Exploration Park."

In Memoriam

McCartney hailed for timely leadership

By **Bob Granath**
Spaceport News

U.S. Air Force Lt. Gen. Forrest McCartney arrived at the Kennedy Space Center at a crucial time. He led the spaceport's team in returning the space shuttle to flight following the loss of Challenger and its seven-member crew, serving as center director under detail from the Air Force beginning Oct. 1, 1986. Following retirement from the military in 1987, he continued at Kennedy until Dec. 21, 1991. McCartney, who is being hailed as one of the most important figures in Kennedy's 50-year history, died July 17, 2012. He was 81.

An Indian Harbour Beach, Fla. resident, McCartney is survived by his wife, Ruth of Memphis, Tenn., and two daughters, Margaret and Worthy.

"Forrest was one of the finest gentlemen I have ever known, and no one cared more for the KSC team than Gen. McCartney," said Kennedy's current director, Robert Cabana.

Steve Griffin, chairman of the National Space Club Florida Committee, added his praise for McCartney's work.

"With the passing of Gen. McCartney, the Florida

space community has lost a great friend, respected leader and a true American hero," said Griffin, general manager of Computer Sciences Raytheon on the Space Coast. "His strong leadership at NASA following the 1986 Challenger disaster helped return the space shuttle to flight." For this, the National Space Club Florida Committee recognized him in 1992 with the Dr. Kurt H. Debus Award, the club's most prestigious honor named for the first director of KSC.

At the time of his death, McCartney was an active member of the Space Club's board of directors.

Commenting recently on the occasion of the 50th anniversary of the Florida spaceport, McCartney had high praise for the men and women of Kennedy.

"It was a privilege and honor to have been a part of the Kennedy Space Center team during the return to flight activities following the Challenger accident," McCartney said. "The KSC shuttle workforce was a 'world class' group of professionals that made their mark on spaceflight history. I will always be grateful to them for letting me join their team."

"After Challenger, morale



Forrest McCartney was director of Kennedy Space Center from Sept. 1, 1987, to Dec. 21, 1991. *NASA file*

was very low and he really worked to bring it up," said George English, the former director of Kennedy's Executive Management Office.

"Forrest restored us with his down-to-Earth approach to fostering teamwork, and brought discipline to the center and its NASA management teams," said Bob Sieck who served as Shuttle Launch director during McCartney's time at KSC. "I credit him with being the one who was most instrumental in changing the NASA culture after Challenger."

A key to his efforts to boost the workforce was getting out of his office at Kennedy's headquarters and seeking employee input.

"He was always out in the processing areas talking with the troops and getting the pulse of KSC," Cabana said.

"He just had this presence when he came over to the Orbiter Processing Facility or wherever we were working on the hardware," said astronaut Nicole Stott, who was then a young engineer working in the shuttle program.

"You could tell even before meeting him that there was a total respect for him," said Stott who has since flown aboard the shuttle and International Space Station. "It was interesting to see how people were just waiting to hear what he had to say, good or bad about what was going on."

Sieck adds that McCartney always championed the workforce.

"He often reminded management that the key to safety and success was to give the workers the 'tools' they needed to succeed,"

said Sieck, who retired from NASA as director of Shuttle Processing. "He was successful in getting Kennedy the resources it needed to improve along with our shuttle processing."

McCartney was also known for his straightforward and analytical approach to problem-solving and his willingness to make tough decisions in spite of a consensus to make a "go for launch" decision.

"At one Flight Readiness Review, there was great pressure to launch in spite of a possible issue with the external tank doors," Cabana said. "When the launch readiness poll was taken and it got to Forrest, he said, 'You can vote all you want, but Discovery's rolling back to the VAB (Vehicle Assembly Building) to be checked out.' It turned out that the doors were, in fact, rigged incorrectly."

Though easygoing, McCartney nonetheless was competitive, English noted. Racquetball was his sport of choice during his tenure leading Kennedy.

"He would sometimes come back to the office after playing racquetball and have bruises all over his legs and his arms," English said. "I remember one of the astronauts challenged Forrest to racquetball and Forrest beat him like a drum. He was a very physical, competitive guy."

From **ALL HANDS**, Page 1

functional structure and its progress.

Ed Mango provided a briefing on the goals and objectives of the Commercial Crew Program. Mango said the program's goal and objectives are being met by commercial partners' ability to reach important milestones.

Joyce Riquelme, manager of the

Center Planning and Development Office, shared future planning ideas for a multiuser spaceport. Riquelme explained the current partnership success and the four major areas of development: Launch Complex 39 Area, Industrial Area, Shuttle Landing Facility, and Exploration Park, currently under construction.

Cabana emphasized the need for

workers' feedback on how to do better or how to clarify what lies ahead for Kennedy. He said that while Kennedy will have budget and technical challenges to work through, the center will remain flexible and evolve as our space program evolves.

"We are building an exploration program with a heavy-lift rocket and spacecraft that have an evolv-

able, capability driven architecture to continue our leadership in space exploration, and when we launch humans again to leave planet Earth, we will do it from Kennedy," Cabana said.

Cabana added, "As successful as the last 50 years have been for Kennedy, I believe the next 50 years are going to be even better."

Astronaut panel shares experiences with ISU participants

By Linda Herridge
Spaceport News

International Space University (ISU) participants Tejal Thakore from India, Christian Luthen from Germany, Kazuyuki Okada from Japan, and many others from around the world heard about the future of human spaceflight during an astronaut panel discussion July 11 at the Kennedy Space Center Visitor Complex in Florida.

The panel of current and former U.S. and international astronauts discussed what it was like to fly on the space shuttle, live on the International Space Station, and their hopes for commercial spaceflight and NASA's exploration into deep space.

"It's been a great experience," Okada said. "I like the diversity of the students and I feel very fortunate that I've had the chance to meet people from so many different countries."

Luthen, a medical doctor, said he's always had a general interest in space and would like to work more in human space life sciences.

Thakore, an aerospace engineer will leave after ISU to work as a Galileo spacecraft controller in Munich, Germany.

"This has been a fantastic and exceptional experience," Thakore said.

Gary Martin, from NASA's Ames Research Center at Moffett Field in California, is director of the ISU Space Studies Program. He said this year's 134 participants are from 31 different countries, with the majority from China, Canada and the U.S.

"All ISU programs are taught at the graduate level and are dedicated to promoting international, interdisciplinary and intercultural cooperation in space activities," Martin said. "The



NASA/Kim Shiflett

Current and former NASA and international astronauts spoke to participants of the International Space University on the future of human spaceflight during a panel discussion at the Kennedy Space Center Visitor Complex on July 11. Participating in the discussion from left are Kennedy Space Center Director Bob Cabana; Winston Scott, dean of the College of Aeronautics at Florida Institute of Technology; former NASA astronaut Kent Rominger, vice president of Alliant Techsystems and former NASA astronaut; Nicole Stott, NASA astronaut currently on detail at Kennedy Space Center; Jim Voss, director of advanced programs at Sierra Nevada Corp. and former NASA astronaut; Garrett Reisman, senior engineer with SpaceX and former NASA astronaut; Ken Bowersox, former NASA astronaut; and Chiaki Mukai, a Japan Aerospace Exploration Agency astronaut. For more about ISU, click on the photo.

programs are taught by more than 100 full- and part-time faculty and invited industry experts from throughout the world."

Participating in the panel discussion were Kennedy Space Center Director and former astronaut Bob Cabana, who also served as moderator. Panelists were Ken Bowersox, former NASA astronaut; Chiaki Mukai, first female astronaut with the Japan Aerospace Exploration Agency; Garrett Reisman, senior engineer with SpaceX and former NASA astronaut; Kent Rominger, vice president, advanced programs and launch systems with Alliant Techsystems and former NASA astronaut; Winston Scott, dean of the College of Aeronautics at Florida Institute of Technology and former NASA astronaut; Nicole Stott, NASA astronaut on assignment working on the agency's Commercial Crew Program at Kennedy; and Jim Voss, director of advanced programs with Sierra Nevada Corp. and

former NASA astronaut.

Cabana opened the discussion by asking the panel what they think it takes to be an astronaut.

Voss said, "I think you have to do the very best you can at everything you do and that should be your goal."

On a question about the commercialization of space tourism, Rominger answered: "I think it's great. More power to them. What people will realize is, as long as the systems that takes them up and bring them back are safe, mechanically, they will learn how to deal with microgravity."

Rominger also said that the goal in the commercial world is to make the transportation as simple as possible so people can enjoy the realization of being in space.

"It's an exciting time," Reisman said. "We are in the age of opening up new possibilities. We have to be able to fly people with less training and experience. That's where we're

headed in the future."

Bowersox said, "The more people we put into space, the more viewpoints we get, and the more likely it is we're going to find those really key aspects of those advantages of living and working in microgravity so that we can take full benefit of it."

A question about what traits would be needed to go beyond Earth brought several responses.

"When we explore beyond planet Earth, we have to be able to deal with contingencies and we have to have crews that are willing to not have everything perfect and in a pristine environment," Cabana said.

"For exploration on deep space missions, you want people with expeditionary

skills and the ability to figure things out for the best chance of success on very dangerous missions," Rominger said. "It will be a team effort and no single person is going to have all the skills."

Cabana closed the discussion by telling the participants what they're doing at ISU is developing relationships and that's something they'll carry with them forever.

"The space program has some awfully unique hardware, but it's not the hardware, it's the people," Cabana said. "I truly believe that when we go exploring it will be the people of planet Earth, not any one nation."

Mukai said, "Keep your dream alive and then pursue your dream."

International Space University facts

The International Space University, or ISU, is in its 25th year of the annual Space Studies Program, an intense nine-week program. It was founded in 1987 and headquartered in Strasbourg, France. ISU is the world's leading international space education institution, supported by the world's leading space agencies and aerospace organizations. Each year it is held in a different host location. This year's program is hosted by the Florida Institute of Technology in Melbourne, Fla., and NASA's Kennedy Space Center. For more information, visit: www.isunet.edu/

Summer library program helps students 'Dream Big'

By Kay Grinter
Spaceport News

What do ginger ale, shaving cream and marshmallows have in common?

The children attending the Florida Libraries 2012 Summer Program July 17 at the Cocoa Beach Public Library know the answer.

The gasses they contain escape when they are placed in a vacuum chamber, changing their composition permanently.

The themes for this year's statewide summer program are "Dream Big" for the preschool and elementary school-aged students and "Own the Night" for tweens and teens.

Educators from Kennedy Space Center are traveling throughout Central Florida this summer also visiting the public libraries in Suntree/Viera, Sebring/Avon Park, Port St. Lucie, Port Orange/New Smyrna, Titusville, Deltona, Cocoa and Micco/South Mainland.

Les Gold, a 31-year veteran aerospace education specialist with Penn State, warmed up the crowd with a presentation on NASA's Curiosity rover, assisted by NASA's Beth Smith, acting lead of Kennedy's Informal Education Outreach

program, engaging the 21 children and 12 parents in attendance.

And what child, regardless of age, does not appreciate a "remote-controlled" vehicle?

Curiosity, which launched from Cape Canaveral last November, is in the headlines again with its arrival at Mars anticipated on Aug. 6.

Gold followed his current events segment with demonstrations illustrating several of Newton's principles.

A rocket, using Alka Seltzer as the propellant, delighted the audience as it careened across the conference room. Weight added to the rocket caused it to travel only a portion of the distance, illustrating the need to keep all flight materials as light as possible.

Friction caused a book, that was slid across a table, to stop in its forward motion, much the same way that atmospheric drag impacts a rocket.

The first volunteer, Noah, a sixth-grader at Roosevelt Elementary School in Cocoa Beach, became a human satellite as he spun on a turntable. He moved hand-held weights close to and then away from his body at Gold's instruction to demonstrate that engineers can control the spin-rate of a satellite in much the same way.

"I found your weight could slow you down or speed you up in space," Noah remarked afterward. "It was really cool and interesting."

Next, a series of demonstrations using a miniature vacuum chamber offered every child the opportunity to participate by "guessing" the outcome of each experiment, becoming, in effect, amateur scientists.

Lucas, a curious second-grader at Windermere Elementary School in Orange County, was not deterred from contributing although his predictions did not always prove to be true.

"Some of the things in the vacuum chamber got bigger," Lucas said afterward. "I thought (they) would turn into liquid but (they) blew up bigger."

To show why spacesuits are imperative to human survival in space, a marshmallow astronaut was constructed using toothpicks and marshmallows of several sizes.

As the air was drawn out of the chamber, the pseudo-spacewalker shrunk in size, crumpling into a misshapen heap. "Our poor little astronaut," Gold moaned as he displayed the malformed figure for all the children to see. "He's dead."

"We'll all see this on Facebook later," he quipped to the adults.

Kathe, a ninth-grader at Cocoa Beach Junior/Senior High School, volunteered to demonstrate the difficulty of basic assembly tasks in space.

Twisting a nut onto a bolt is easy with bare hands but almost impossible wearing space gloves, she found, illustrating that astronauts require special tools to help them perform routine jobs.

Gold instructed Kathe to try the task again, this time standing on the turntable.



NASA/Kim Shiflett

Beth Smith, at left, acting lead of Kennedy Space Center's Informal Education Outreach program, assists Michael adjust a spacesuit helmet for a photo opportunity. Michael is one of 21 children attending a NASA presentation at the Florida Libraries 2012 Summer Program on July 17 at the Cocoa Beach Public Library. His brother Lucas and other aspiring astronauts wait their turns to try on the suit and imagine what it must be like to venture into space.

Every motion spun her away from the hardware, highlighting the need for astronauts to be tethered in place or face the danger of floating away. Kathe's natural response to her thwarted efforts caused Gold to dub her the "giggly astronaut."

"How do they (the astronauts) do that?" Kathe asked. "They make it seem so easy." Gold explained that real-life astronauts practice their spacewalks in a large swimming pool, the closest thing to a microgravity environment available to them during training. Kathe described her experience attempting to do a simple task wearing the gloves as "difficult, very difficult" and especially "challenging."

The space-related lessons came to a close with an activity called "Impact Cratering." All of the children were invited to create craters in boxes filled with a simulated soil made from a mixture of flour, salt, oatmeal and cocoa. Pebbles, marbles and crumbled foil stood in for "asteroids" which the children were encouraged to drop from varying heights to observe the depths of the craters they dug in the imaginary planetary surfaces below.

As the support staff swept up the debris surrounding the newly formed craters, the

cameras came out for photos of NASA's future astronauts in a spacesuit.

As Gold and Smith packed up the demonstration equipment and gear, they fielded questions from their young audience, hoping that some of them will be inspired to pursue advanced studies in science, technology, engineering or mathematics, the STEM disciplines vital to NASA's future.



NASA/Kim Shiflett

Noah, a sixth-grader at Roosevelt Elementary School in Cocoa Beach, creates an "impact crater" using an improvised "asteroid" during a NASA outreach event at the Florida Libraries 2012 Summer Program on July 17 at the Cocoa Beach Public Library.



NASA/Kim Shiflett

Veteran aerospace education specialist Les Gold, left, offered a series of lessons illustrating Newton's Laws to the children attending a NASA outreach event at the Florida Libraries 2012 Summer Program on July 17 at the Cocoa Beach Public Library. Here, he demonstrates that performing simple tasks, such as threading a nut and bolt, is difficult wearing spacesuit gloves, assisted by Kathe a ninth-grader at Cocoa Beach Junior/Senior High School.

ISU students reach beyond expertise to launch rockets

By Steven Sicheloff
Spaceport News

A lawyer from New York took his own giant leap into rocketry as his team won the International Space University's rocket launch competition at NASA's Kennedy Space Center on July 14.

"I never saw myself doing this when I was sitting in the (law) library," said Eric Dawson, an attorney who was one of 134 students from 31 nations taking part in this year's space-focused academics with ISU. "I never saw myself as a rocket scientist, but I guess I am now. I don't think I've taken a science class in seven years."

Six teams designed and built large model rockets, each about three feet tall, and launched them from Launch Pad 39A, the starting point for Apollo missions to the moon and dozens of space shuttle flights. Each launch carried a raw egg, dubbed "eggstronauts" which had to be recovered intact to be declared successful.

The fact that an attorney was taking part in an engineering course and competition was not an accident, said Anglie Bukley, dean and vice president for Academic Affairs at ISU, which is based in Strasburg, France.

"We encourage people who aren't engineers to work in engineering tasks," Bukley said. "Don't do something you're already good at it. This is a chance to expand."

The same holds for other disciplines, as well. ISU offers in-depth courses on a variety of space-related topics and the faculty encourages students to cross into different fields. For example, engineers who build rockets for a living might learn more taking a class in life sciences.

ISU holds its summer session in a different part of the world each year. This was the first time the classes have been conducted in Florida, with Kennedy co-hosting the event along with the Florida Institute of Technology, or Florida Tech, in Melbourne.

"To be able to launch our rockets from this historic site is just beyond words," Bukley said.

Ganesh Pillai of India, who worked with Dawson on the Phoenix, said the team designed a rocket



NASA/Charisse Nahser

Faculty and students of the International Space University gather in front of Launch Pad 39A at Kennedy Space Center on July 14. Six teams designed and built large model rockets, each between three and five feet tall. Each launch carried a raw egg, dubbed "eggstronauts," which had to be recovered intact to be declared successful. To learn how space leaders are challenging ISU students for bold ideas, click on the photo.

to use the most powerful engine available.

"We wanted to go very high," Pillai said. "We've always seen this on TV, the shuttle launch, so being able to be here and launch is an awesome experience."

Fredrick Aarrestad of Norway said his team built its pink rocket, named "My Little Rocket," to show that advanced technology can be sprinkled with a little fun. The team included a small, purple, stuffed unicorn in their rocket, the mascot of Unicorn Galactic.

"We have an airborne unicorn!" Aarrestad yelled to the crowd as the rocket lifted off.

Even when launches didn't go well, the students, ranging in age from 21 to 58, took it in stride.

For example, when the Icarus team's craft lifted off like a rocket but landed like a javelin, the four students still bounded into the field happy and excited just to get the chance to launch.

"This is like the greatest day of my life," said Alexander Bartolo of London. "The issue with rocket science is that you don't want to push the envelope too much because you want it to be reliable. And we were

the only ones to use two parachutes and only one of them opened."

Rui Sousa of Portugal, who also worked on the Icarus rocket, said the ISU experience was one of a kind, but they still felt the pressure of deadlines.

"We had to design the whole rocket in just three hours because they had to order the parts the next day," he said before the launch. "It's the first time we've built a rocket, so we are just hoping everything goes."

Flying to 669 feet and parachuting back safely with egg intact, the Goldmember rocket was one of the six to win performance accolades.

"Everything went well," said Anna Szwemin of Poland. "It's an amazing feeling."

Some real rocket scientists took part in the event, too, including Kelvin Manning, associate director at Kennedy.

"It gets people so enthused about the possibilities of exploration, launching rockets in small scale to making it a bigger scale to send people out beyond low Earth orbit," Manning said, "and that's what we're all about."



NASA/Charisse Nahser

A model V-12 rocket built by students of the International Space University launches from Launch Pad 39A at Kennedy Space Center during the rocket launch competition of ISU's summer session on July 14. To learn how ISU encourages cooperation with international flair, click on the photo.

Remembering Our Heritage

Apollo 15 mission provided lessons for future exploration

By Bob Granath
Spaceport News

During the summer of 1971, Apollo 15 took America's lunar landing program to the next level. With more science and the addition of the Lunar Roving Vehicle, or LRV, it was the most complex mission to date. The flight would also help pave the way for exploration years into the future.

The two previous lunar missions included a pair of moonwalks by the astronauts. Apollo 15 Commander David Scott and Lunar Module, or LM, Pilot James Irwin would have three, each utilizing the electric-powered, four-wheel-drive Lunar Rover to travel 17 miles around the landing site.

Command Module Pilot Alfred Worden remained in lunar orbit, operating orbital sensors in a Scientific Instrument Module mounted in the spacecraft's service module while circling the moon for 74 orbits over 145 hours. Worden also deployed a small sub-satellite which was left in lunar orbit.

With months of preparation and training complete, Apollo 15's Saturn V rocket thundered off Kennedy Space Center's Launch Pad 39A on July 26, 1971.

"I'll never forget that morning and the power of the rocket that you assembled for us," Irwin said addressing Kennedy employees during a visit in March of 1987. "It was an exciting mission to explore the mountains of the moon."

Apollo 15 was headed for a landing site surrounded by the Hadley-Apennine Mountains to the south and east and the deep, canyon-like Hadley Rille to the west. Lunar geology training was stepped up in hopes that Scott and Irwin might find rocks and soil samples that could unlock secrets of the origins of the moon.

While the geology training took place in exotic places such as the California desert and Hawaii, many of the simulations for the moon walks occurred in a field near what is now Kennedy's Operations and Checkout Building. The site would come to be known as the "rock pile."

Tons of volcanic cinders, rocks and boulders were unloaded in the area to make it resemble the lunar surface. The site allowed astronauts



NASA file/1969

Apollo 15 Lunar Module Pilot James Irwin practices deploying a surface experiment during a training exercise at Kennedy Space Center on July 7, 1971. Commander David Scott is working in the background on the simulated lunar surface near what is now the Operations and Checkout Building.

preparing for lunar missions to develop procedures and practice using the geology tools. Since Scott and Irwin used the area to practice driving the Lunar Rover, the area was also dubbed the "rover racetrack."

Lessons learned from those early days of developing Kennedy training sites for exploring beyond low Earth orbit are now being applied to possible ventures to Mars or a return to the moon.

When the Apollo lunar modules descended, astronauts could take control to avoid hazards on the surface. But as the experience of two flights shows, additional aids may have helped.

"On two Apollo missions, the LM landed on a ten-degree slope," said NASA Test Director Greg Gaddis. "We believe that if one had landed on a slope greater than 12 degrees, they might not have been able to take off."

As future spacecraft are being designed for destinations beyond Earth, NASA's Project Morpheus, led by the Johnson Space Center, involves developing a prototype lander to demonstrate technologies aiding in hazard avoidance. The Morpheus lander arrived from Johnson to Kennedy on July 27.

"The Autonomous Landing and Hazard Avoidance Technology, or ALHAT, being developed by NASA and tested with Morpheus is designed to

detect rocks, slopes and craters whether assisting robotic or human space missions," said Gaddis Kennedy's Morpheus test site manager.

Just north of Kennedy's Shuttle Landing Facility runway, a rock- and crater-filled planetary scape has been built so engineers can test the ALHAT system's ability to provide the required navigation data and test the Morpheus vehicle's ability to negotiate away from risks.

"We want to see if the new technology can identify hazards and avoid them while landing in a safe area," Gaddis said.

On Apollo 15, Scott and Irwin safely landed between mountain ranges and a rille on July 30. Their ambitious schedule included three moonwalks totaling 10 hours, 36 minutes of setting up experiments, collecting rocks and testing the new lunar rover.

"On the second day, we drove up the side of a mountain about a thousand feet," Irwin said. "We saw a rock sitting on another almost free of dust. It seemed to be saying, 'I'm here, take me!'"

Upon seeing the rock, Scott knew the geology training had paid off.

"Guess what we just found," he radioed to Mission Control. "I think we found what we came for."

It was a white anorthosite rock weighing about half a pound. Geologists dubbed it the "Genesis rock" as it turned out to be more than four billion years old.

"It would help scientists understand the early history of the moon and maybe the early history of Earth," Irwin said.

During the return flight back to Earth, Worden became the first to perform a spacewalk outside of Earth orbit. With Irwin assisting in the command module hatch, Worden retrieved film canisters from the Scientific Instrument Module.

After splashdown in the North Pacific Ocean on Aug. 7, 1971, the crew was recovered and taken aboard the recovery ship, the USS Okinawa, after a mission lasting 12 days, seven hours.

Apollo 16 and 17 would fly similar missions in 1972 with three moon walks, use of the lunar rover and a spacewalk during the return trips. The lessons learned preparing for these missions will continue to prove valuable as NASA plans for future flights beyond Earth.



Photo courtesy of Greg Gaddis/NASA

This panoramic view shows the Project Morpheus prototype lander's simulated planetary site built for testing Autonomous Landing and Hazard Avoidance Technology on July 13. Engineers plan for the Morpheus spacecraft to navigate amidst rocks, craters and other hazards during its descent, touching down in a clear landing area. Project Morpheus is one of 20 small projects comprising the Advanced

Exploration Systems, or AES, program in NASA's Human Exploration and Operations Mission Directorate. AES projects pioneer new approaches for rapidly developing prototype systems, demonstrating key capabilities and validating operational concepts for future human missions beyond Earth orbit. For more information on Project Morpheus, click on the photo.

Historian: Kennedy heading in right direction

By Steven Sicheloff
Spaceport News

Kennedy Space Center's future as a multiuser launch center may well hinge on the same question asked before NASA made the cape its primary launch site, said noted space historian and policy analyst John Logsdon.

"It's basically the same decision as was made in 1961: Why go somewhere else when the basic infrastructure is here?" Logsdon said following a presentation from his new book "John F. Kennedy and the Race to the Moon."

Then, when Merritt Island was competing with Cumberland Island in Georgia to house NASA's emerging manned space program, planners noted that the Air Force already had established the Eastern Range, and building a new center somewhere else would mean duplicating that work. They obviously chose to stick with the infrastructure already in place.

Now, as several companies develop launchers and spacecraft for trips to low Earth orbit, space entrepreneurs are facing a similar decision about where to launch.



NASA/Kim Shifflett

Space historian John Logsdon spoke to Kennedy Space Center workers and signed his new book "John F. Kennedy and the Race to the Moon" on July 11.

Some of the decisions are not yet made, but there has been commitment from some companies to launch from Kennedy, while others are looking into capabilities elsewhere.

For its part, NASA and Kennedy are refurbishing the shuttle launch pads and processing facilities across the center to host numerous types of spacecraft. It's quite a different approach from previous eras when the center's human spaceflight efforts

focused on processing and launching a single type of spacecraft.

"It's a major shift in the organizational style of the place," Logsdon said. "I think Mr. Cabana is leading in exactly the right direction, but it's not a sure thing. Is there going to be a thriving space launch business that will need launch sites and a range and all of that? I think the answer is yes."

The focus of commercial launch companies will not likely extend beyond low Earth orbit, Logsdon said.

"Commercial success is going to be driven by the demand for access to space for either profit-making robotic things or for people who want to go," Logsdon said. "I can't conceive of, in my lifetime or even your lifetime, privately funded ven-

tures out beyond low Earth orbit of any scope -- maybe stunts of flying around the moon. It's a combination of political will and profit-driven commercial enterprises that will make this place."

Covering the 30 months of John F. Kennedy's presidency following the mandate to send astronauts to the moon, Logsdon said his research showed that the race to the moon was not about romantic visions of humanity exploring the cosmos. Instead, it was an out-and-out show of technological muscle and national willpower in the mind of President John Kennedy.

"It was, in Kennedy's mind and continued to be about demonstrating U.S. leadership vis-à-vis the Soviet Union in a kind of zero-sum Cold War world," Logsdon said. "Countries around the world (were) becoming independent, choosing what form of political organization to ally themselves with, the United States or Soviet Union."

Logsdon, who wrote his doctoral thesis about Kennedy's decision to set the nation on a course to land astronauts on the moon, analyzed where space fit into the Kennedy agenda before the president was assassinated.

Logsdon said that once Kennedy decided to push for the lunar landing, it took a continued effort by the president and then his successor to see it through. Since Apollo, NASA has matured as a federal agency and its evolution depends on the national goals for space and science.

In celebration of Kennedy Space Center's
50th anniversary, enjoy this vintage photo . . .

FROM THE VAULT



NASA file/1964

This aerial view shows the construction of the Bascule Bridge and the the Orsino Causeway on April 7, 1964. This section of NASA Road (across the Indian River) was named NASA Causeway East on Oct. 29, 1964. The section that crosses the Banana River is called NASA Causeway West.



John F. Kennedy Space Center

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